

EXPLORING TRANSFORMATIONS OF PARABOLAS (QUADRATICS)

Standard Form: $y = ax^2 + bx + c$

Play with the applet <http://www.mathopenref.com/quadraticexplorer.html> to answer the questions below:

1. What does changing the a value do to the parabola?
 - a. If I make $|a|$ bigger, the parabola gets _____.
 - b. If I make $|a|$ smaller, the parabola gets _____.
 - c. What happens when a is negative?
2. What does changing the c value do to the parabola?

Vertex Form: $y = a(x - h)^2 + k$

Play with the applet <http://www.mathopenref.com/quadvertexexplorer.html> to answer the questions below:

3. What does changing the a value do to the parabola?
4. What does changing the h value do to the parabola?
 - a. If h is positive, the graph shifts _____.
 - b. If h is negative, the graph shifts _____.
5. What does changing the k value do to the parabola?

Apply:

6. On the Standard Form applet, create the parabola $y = -3x^2 + 12$
 - a. Describe the ways that this parabola is a transformation of $y = x^2$
 - b. Give the roots of the quadratic function.
7. Create the parabola $y = 0.5x^2 - 3x - 8$
 - a. Describe how this parabola is a transformation of $y = x^2$
 - b. Give the roots of the quadratic function.
8. On the Vertex Form applet, create the parabola $y = 2(x - 4)^2 + 3$
 - a. Describe the three ways that this parabola is a transformation of $y = x^2$
 - b. Give the vertex of the quadratic function.
9. Create the parabola $y = -5(x + 1)^2 + 10$
 - a. Describe how this parabola is a transformation of $y = x^2$
 - b. Give the vertex of the quadratic function.
10. What is the vertex of $y = -0.2(x + 5)^2 - 4$?
11. What is the vertex of $y = (x - 8)^2 + 5$?
12. Generalize: What is the vertex of $y = a(x - h)^2 + k$?
13. Write the equation for a parabola that opens down, is skinnier than $y = x^2$, and whose vertex is $(2, 3)$.
14. Write the equation for a parabola that is wider than $y = x^2$, and whose vertex is $(-5, 7)$.

CW - Transformations of Quadratic Functions

- A. List the value(s) of a , c , h , or k in $y = a(x-h)^2 + k$
B. Describe how each of these values transforms the graph.

1. $y = 2x^2 - 4$

 $a =$ $c =$

2. $y = -x^2 + 2$

 $a =$ $c =$

3. $y = -4x^2$

 $a =$ $c =$

4. $y = (x-6)^2 + 7$

 $a =$ $h =$ $k =$

5. $y = (x+3)^2$

 $a =$ $h =$ $k =$

6. $y = -3(x-2)^2 - 1$

 $a =$ $h =$ $k =$